Crooked Creek Fish Barrier

Presented by:
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Introduction

- Protect native Yellowstone Cutthroat populations.

- Naturally formed rock barrier provided blockage from non-native species protecting approximately 4 miles of stream.

- Wildfires burned through drainage in July 2002. Next spring severe flooding rerouted channel around barrier.
  - Floods sterilized portions of the stream reducing YCT numbers below 200 fish
Introduction

- Project will protect 1 of 3 genetically pure Yellowstone Cutthroat Trout (YCT) populations on BLM and 1 of 6 pure YCT populations on Custer National Forest property.

- Forest Service selected a location approximately 3 miles downstream of existing location on BLM property.
  - Narrowest point of channel, controlled by bedrock

- Location extended native YCT habitat to 7 miles in Crooked Creek drainage.
Introduction

- Location selected is part of BLM wilderness study area.
  - No motor vehicle access
  - Closest access point is ¼ mile away with a 700 foot elevation change

- Forest service constructed temporary gabion barrier to prevent migration until construction is complete.
Location

Pryor Mountain Range

Crooked Creek

“Historic” Barrier Site

Gabion and Proposed Barrier Site

CNF

BLM
Funding

- Project in cooperation with Custer National Forest and BLM
  - Great West Engineering selected to do design

- Funded by MTFWP, BLM, and CNF

- Project cost $365,000
Design

- Design criteria
  - Block migration of nonnative species
  - Permanent structure that will withstand severe flooding and debris torrents
  - Consideration given to visual and environmental impacts
  - Design tailored towards construction under very challenging conditions
    - No vehicular access
    - Steep Terrain
Design

- Biological Evaluation
  - Design Species – 20 inch Rainbow and Brown Trout
  - Fish behavior at obstructions and waterfalls
    - Naturally attracted to falling water
    - Leap from plunge pools and hydraulic jumps
  - Two basic elements of fish blockage
    - Leaping height
    - Water velocity
Design

- Calculated fish swim speed and leaping height
  - Burst speed of 15 fps
  - Leaping height of 3.5 feet – distance of 7 feet
Design

- Several different barrier types evaluated during preliminary design
  - Vertical drop
  - Velocity
  - Rotary drum
  - Electronic

- Different materials evaluated (steel, concrete, gabion baskets)

- Concrete weir drop with slab chosen as barrier design
  - Structure is 36 feet wide
  - 5.75 foot drop
  - 20 foot concrete slab
Design

Crooked Creek Fish Barrier GWE Model  Plan: Proposed "V" Weir  9/17/2007

Legend
WS Q100
WS 5 yrs
Ground
Construction

- Bairco Construction selected as prime contractor

- Proposed use of a cable trolley system instead of airlifting materials & equipment
  - Supports over 4,000 lbs
  - Shuttle supplies in less than 5 minutes
### Construction

- Mobilized skid-steer and mini excavator for site excavation
- Diverted channel around excavation utilizing diversion dam and culverts
- Protected site from erosion using fiber rolls and sandbags
Construction

- Contractor used ready-mix concrete sacks
  - Coloring added at manufacturing plant
- Mixed concrete with mechanical mixer at project site
- 2,017 bags of concrete
Questions?

Thank You